

<https://doi.org/10.25221/fee.484.2>

<https://elibrary.ru/gtaryo>

<https://zoobank.org/References/2B6CE900-0592-4E34-96D7-2B84E25CA192>

**A NEW SPECIES OF THE *HAMMERAE*-GROUP OF THE GENUS
ANURIDA LABOULBÈNE, 1865 (COLLEMBOLA: NEANURIDAE)
FROM PRIMORSKY KRAI**

A. B. Babenko

*Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow
119071, Russia. E-mail: lsdc@mail.ru*

Summary. *Anurida octoculata* **sp. n.** is described from a protected coniferous-broad-leaved forest of the Vladivostok Botanical Garden. The species belongs to the Beringian *hammerae*-group, which occupies a rather isolated position within the genus. The most characteristic feature of the new species is reduction of axial chaetotaxy, namely, the absence of setae *p1* on all terga from *Th.2* to *Abd.4*. Among the species of the group with a low number of ocelli, it shares this character with only two known congeners: *A. reducta* Fjellberg and *A. narli* Fjellberg, but it can easily be distinguished by the number of ocelli, the fine structure of the maxillary head, and peculiarities of chaetotaxy. New distribution data on *A. hirsuta* Babenko et Nakamori and *A. elegans* Babenko, Shveenikova et Kuznetsova are given also.

Key words: springtails, Pseudachorutinae, taxonomy, new species, fauna, new records, Vladivostok, Russia.

А. Б. Бабенко. Новый вид группы *hammerae* рода *Anurida* Laboulbène, 1865 (Collembola: Neanuridae) из Приморского края // Дальневосточный энтомолог. 2023. N 484. С. 9-16.

Резюме. Из охраняемого хвойно-широколиственного леса Ботанического сада Владивостока описан новый вид *Anurida octoculata* **sp. n.**, который принадлежит к берингийской группе *hammerae*, занимающей весьма обособленное положение внутри рода. Наиболее характерным признаком нового вида является редукция осевой хетотаксии на дорсальной поверхности тела, а именно отсутствие щетинок *p1* на всех тергитах от *Th.2* до *Abd.4*. Среди видов группы с низким числом глазков этот признак, помимо описываемого вида, свойственен лишь двум видам: *A. reducta* Fjellberg и *A. narli* Fjellberg, от которых *A. octoculata* **sp. n.** легко отличим по количеству глазков, тонкому строению головки максиллы и особенностям дорсальной хетотаксии. Также приведены новые данные о распространении *A. hirsuta* Babenko et Nakamori и *A. elegans* Babenko, Shveenikova et Kuznetsova.

INTRODUCTION

This paper is based on material collected during winter months (November 20, 2016 – March 11, 2017) using under-snow traps in a forest in the territory of the Botanical Garden

of the Far East Branch of the Russian Academy of Sciences (Vladivostok). This ‘isolated’ island of virgin coniferous-broad-leaved forests with the main forest-forming species being the black fir (*Abies holophylla*) and the Korean cedar (*Pinus koraiensis*) in the territory of a big city has been preserved thanks to the conservation regime that was established there in 1949 and, like other preserved black fir forests of southern Primorye, it is characterized by a markedly increased biodiversity (Bulah *et al.*, 2010). In this collection, three species of the genus *Anurida* from the *hammerae*-group were found, two of which were recently described, while the third congener also turned out to be new. Below is a description of this new species, as well as some comments on the other two congeners, slightly rectifying their original descriptions.

Follow abbreviations used in the text and figures: *Abd.1–6* – abdominal segments; *Ant.1–4* – antennal segments; *AO* – antennal organ on *Ant.3*; *a-, m-, p-*setae – setae of anterior, medial, and posterior rows on terga, respectively; *hr*-setae – microsetae on anal valves; seta *i* – microseta on *Ant.4*; *ms* – microsensillum(a); *or* – organite on antennal tip; *PAO* – post-antennal organ; *S1–S4*, *S7–S8* – antennal sensilla; *sgv* and *sgd* – ventral and dorsal guard sensilla of *AO*, respectively; setae of *B*-whorl – tibiotarsal setae, named according to Deharveng (1983).

DESCRIPTION OF A NEW SPECIES

Anurida octocolata Babenko, sp. n.

<https://zoobank.org/NomenclaturalActs/83F82906-531A-49F1-8710-D75D543FBB19>

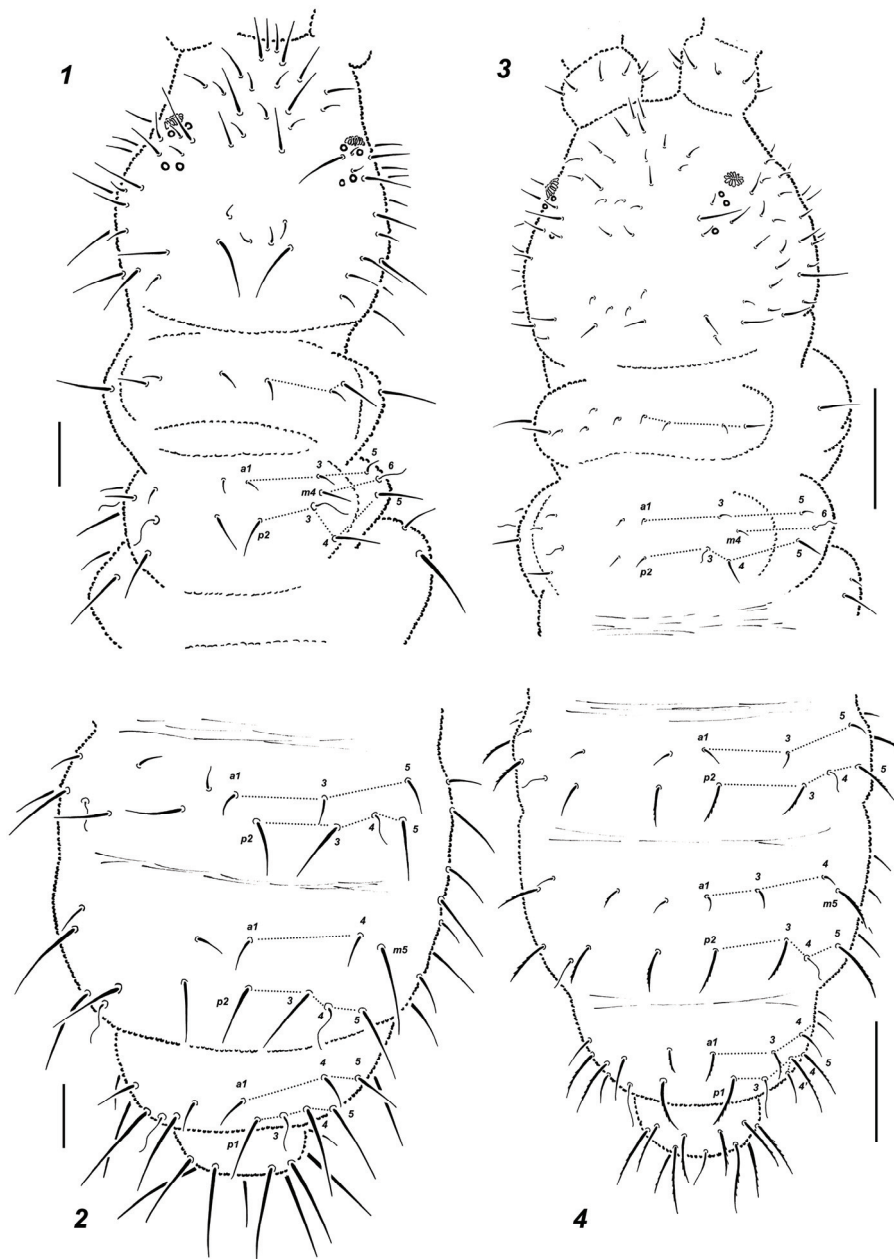
Figs 1–14

MATERIAL. Holotype: ♀, **Russia:** Primorsky Krai, Vladivostok Botanical Garden, 43.2222°N 131.9936°E, coniferous-broad-leaved forest, winter traps, 20 November 2016 – 11 March 2017, leg A.D. Komisarenko. Paratypes: 12♀ and 2♂, same data as holotype. The types are kept in the collection of Zoology and Ecology Department of the Moscow State Pedagogical University, Russia (MSPU).

DIAGNOSIS. A large species of the *hammerae*-group characterized by the presence of 4+4 uncoloured ocelli, six blunt sensilla on *Ant.4*, two of which (*S1* and *S2*) being much thinner than others, an oval *PAO* with about 30 finely granulated lobes, mandibles with five teeth, maxillae with all lamella serrated, one of which (*L2*) passing much beyond the capitulum tip, and by the absence of *p1* setae on all terga from *Th.2* to *Abd.4*, and *a3* setae on *Abd.4–5*.

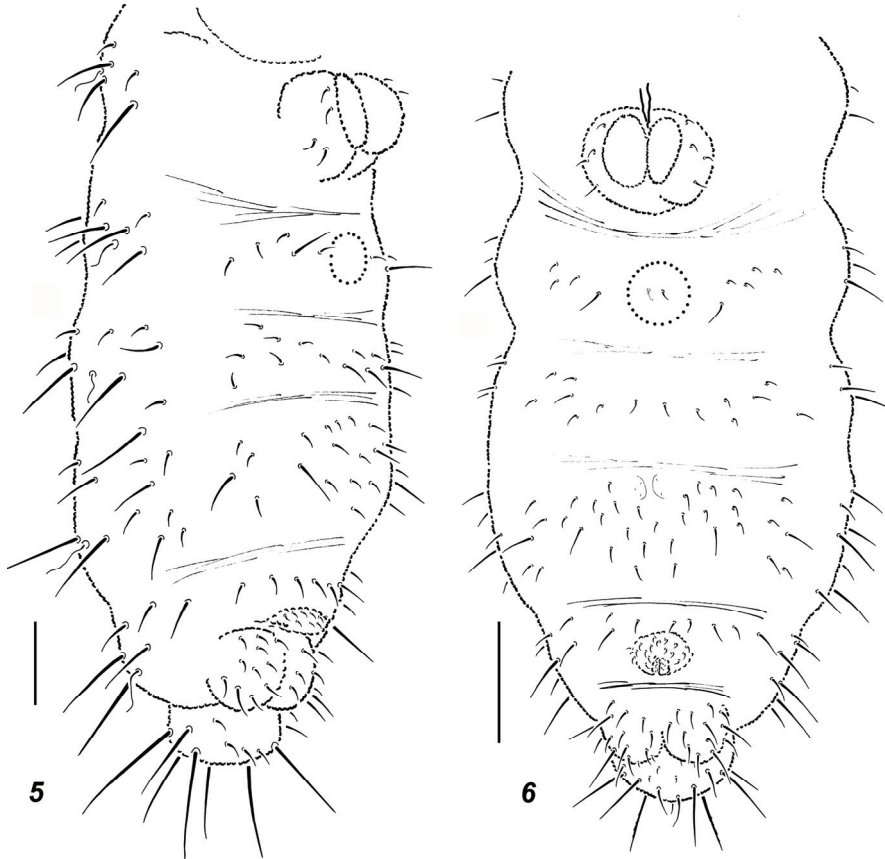
DESCRIPTION. Length of holotype without antennae: 2.4 mm. Colour of live specimens unknown, all available specimens kept in alcohol without any traces of a dark pigment even on ocular area. Body shape typical of the *hammerae*-group: *Abd.6* wide and with a more or less straight posterior edge (Fig. 2). Integument granulation fine and uniform, cuticle without distinct inner reticulation.

Ocelli present, 4+4 as a rule. *PAO* elongate, consisting of 28–31 finely granulated lobes, its long axis 3.4–5.7 times as long as diameter of nearest ocellus (Fig. 12). Antennae about as long as head diagonal, shape typical of the genus. *Ant.4* with a large 3-lobed apical bulb and 6 curved sensilla, *S1* and *S2* clearly thinner, subapical *ms*, organite and seta *i* present (Fig. 13). *Ant.3* usually with 19 (18–20) ordinary setae and *AO* of typical shape, *sgd* about as long as *sgv*, inner sensilla rather long, a small *ms* present ventrally. *Ant.1–2* with 7 and 14(15) setae, longest setae on *Ant.1* clearly shorter than segment width (0.6–0.7 : 1). Labrum with a usual set of setae, arranged as 4/2-3-3-4 (Fig. 11). Apical part of labium with three setae and two small sensillar papillae; basal parts (mentum and submentum) with usual 4+4 setae (Fig.



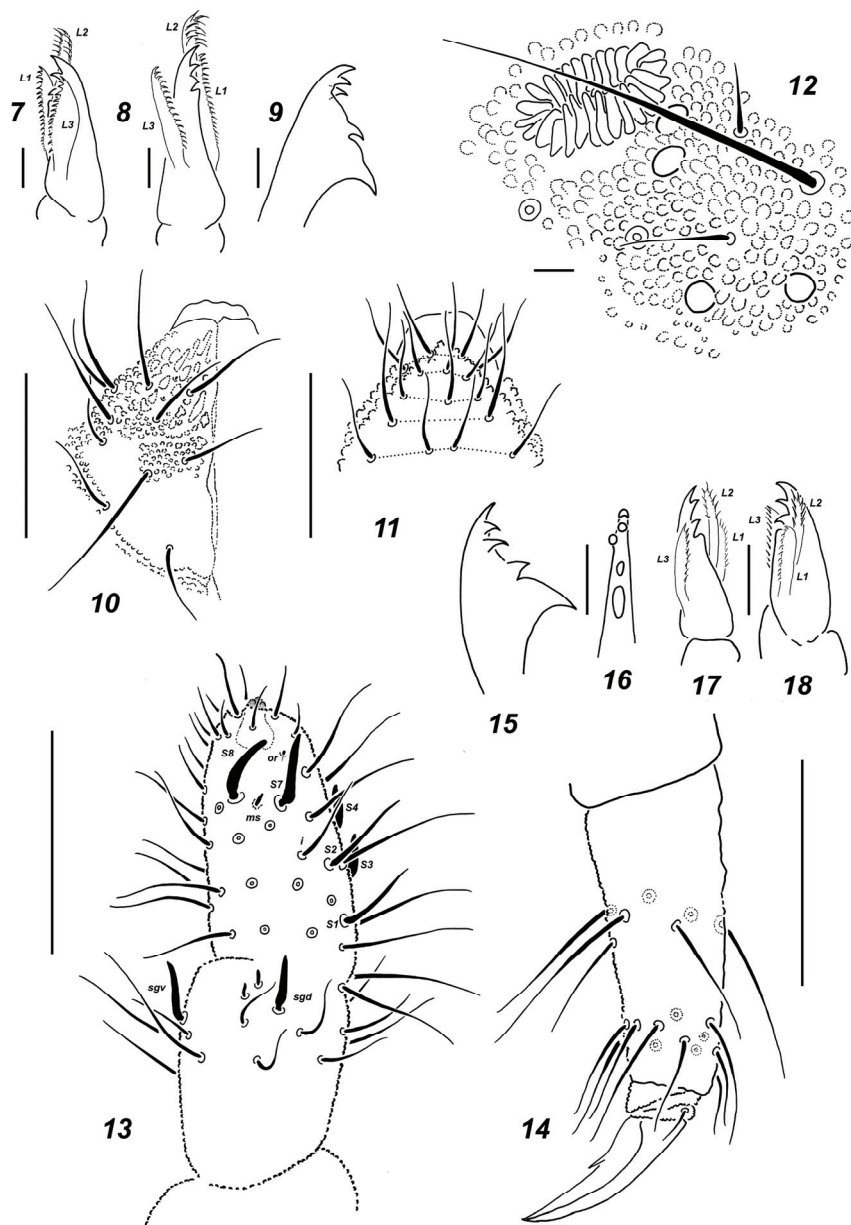
Figs 1-4. *Anurida octoculata* sp. n. (1-2) and *A. narli* (specimen from Chukotka) (3-4). 1 - dorsal chaetotaxy of head and Th.1-2; 2 - dorsal chaetotaxy of Abd.3-6; 3 - dorsal chaetotaxy of head and Th.1-2; 4 - dorsal chaetotaxy of Abd.3-6. Scales: 0.1 mm.

10), 2+2 postlabial setae present on head along ventral line. Mandibles (Fig. 9) with three small apical teeth set slightly out of line and two larger basal ones. Maxillary capitulum with three apical teeth in main part followed by a smooth cutting edge and three serrate lamellae, *L*.2 long, reaching much beyond the tip of capitulum (Figs 7–8).



Figs 5–6. Abdominal chaetotaxy of *Anurida octoculata* sp. n. (5) and *A. narli* (specimen from Chukotka) (6). Scales: 0.1 mm.

Common dorsal setae clearly differentiated into macro- and microsetae, macrosetae long, erect, rather coarse, but usually smooth, sensilla thin, whip-like, more or less subequal on all terga, their number as usual 22/11111; lateral microsensilla (*ms*) present on *Th*.2. Dorsal chaetotaxy as in Figs 1–2. Main characteristics: tergum of *Th*.1 with 3+3 setae; setae *p*1 absent on all terga from *Th*.2 to *Abd*.4; *Th*.2–3 with sensilla (*p*3) in anterior position in front of macrosetae *p*4, three setae (*a*1, *a*3 and *a*5) of *a*-row and seta *m*4 present (Fig. 1); *Abd*.1–3 with 3 *a*-setae (*a*1, *a*3 and *a*5) and 2+2 macrosetae (*p*2 and *p*3) between sensilla *p*4; *Abd*.4 with only two *a*-setae (*a*1 and *a*4) and a lateral macroseta *m*5 between *a*- and *p*-rows; *Abd*.5



Figs 7–18. *Anurida octoculata* sp. n. (7–14) and *A. narli* (specimen from Chukotka) (15–18): 7–8 – maxillary head (two different view); 9 – mandible; 10 – labium; 11 – labrum; 12 – PAO and ocular field; 13 – Ant.3–4; 14 – tibiotalarsus and unguis of hind leg; 15–16 – mandible (two different view); 17–18 – maxillary head (two different view). Scales: Figs 10–11, 13–14 – 0.1 mm, 7–9, 12, 15–18 – 0.01 mm.

always without *a3* (Fig. 2). Thoracic sterna without setae. Ventral tube with four setae on each side. Chaetotaxy of abdominal sterna as in Fig. 5, sternum of *Abd.2* without setae in medial position. Furca reduced to two poorly visible swellings near anterior border of *Abd.4* sternum, each with (2)3 tiny setulae without visible alveoli. Each anal valve usually with three small *hr*-setae.

Chaetotaxy of legs 1–3 as follows: upper subcoxae – 1, 2, 2; lower subcoxae – 0, 2, 2; coxae – 3, 8, 8; trochanters – 6, 6, 6; femora – 13, 12, 11; tibiotarsi – 19, 19, 18 setae, respectively, significant variations infrequent. Tibiotarsal setae rather long and thickened, longest inner setae of *B*-whorl slightly longer than inner unguis edge (1.1–1.4 : 1). Unguis with a clear inner tooth (Fig. 14), lateral ones invisible.

REMARKS. At present, the *hammerae*-group includes at least ten described species found on both sides of the northern Pacific (Babenko & Nakamori, 2021). Among them, there are only four congeners lacking axial setae *p1* on all terga from *Th.2* to *Abd.4* as observed in *A. octoculata* **sp. n.**: *A. luciae* Fjellberg, 1985, while in this species *p1* can occasionally be present on *Th.2–3* (Fjellberg, 1985b), *A. elegans*, both recorded from the eastern Palaearctic, *A. reducta* Fjellberg, 1985, found so far only in the environs of Fairbanks, Alaska, and the amphi-Beringian *A. narli* Fjellberg, 1985. The former two are characterized by a feature rather unusual for the genus, namely, the presence of 7+7(8) ocelli, and both are fairly easy to distinguish from *A. octoculata* **sp. n.** *Anurida reducta* is blind and much smaller than *A. octoculata* **sp. n.** (1.0 vs almost 2.5 mm), and although its dorsal chaetotaxy is practically identical to that in *A. octoculata* **sp. n.**, the level of its differentiation into macro- and microsetae is hardly comparable with that in *A. octoculata* **sp. n.** *Anurida narli* is perhaps the most similar to the new species, since the whole range of variation in the number of ocelli (2–4) also includes that typical of *A. octoculata* **sp. n.** Nevertheless, these two species differ quite reliably in the details of dorsal chaetotaxy. In particular, *A. narli* always has *a3* present [on *Abd.4–5*, as well as] additional short seta *p4'* obliquely behind the macrochaeta *p4* (Fjellberg, 1985a: 106). Apart from this, these two species clearly differ in the differentiation of the dorsal chaetom (cf. Figs 1–2 and 3–4): in *A. narli* setae are usually short and thin on anterior part of body, notably coarser towards tip of abdomen [becoming] more distinctly ciliate/serrate there (Fjellberg, 1985a: 105). A differentiation of dorsal setae in *A. octoculata* **sp. n.** is almost the same throughout the body (see Figs 1 and 2), while macrosetae are much longer and usually smooth.

The most reliable feature for distinguishing species within the genus *Anurida* is undoubtedly the fine structure of the mandibles and maxillae. Unfortunately, maxilla and mandible were not examined in detail during the original description of *A. narli*; it was only said that they are apparently not different from those of *A. reducta* (Fjellberg, 1985a: 105). This latter statement appears to be fully correct (see Figs 15–18), at least as regards the available material from the eastern Chukotka (not types). The study of this material undoubtedly indicates differences in the fine structure of the maxillae in *A. octoculata* **sp. n.** and *A. narli* (cf. Figs 7–8 and 17–18), while the mandibles are quite similar (cf. Figs 9 and 15–16). Specimens of *A. narli* from Chukotka and *A. octoculata* **sp. n.** also differ in the absence (in *A. octoculata* **sp. n.**) or the presence (in *A. narli*) of setae in the medial region of *Abd.2* sternum (see Figs 5 and 6). This can also be a good diagnostic feature, but it needs to be tested on more specimens from different locations.

DISTRIBUTION. The species is only known from the type locality.

ETYMOLOGY. The name of the new species reflects the number of ocelli, a highly variable character (0–8) within the *hammerae*-group.

NEW RECORDS

Anurida hirsuta Babenko et Nakamori, 2021

MATERIAL EXAMINED. **Russia:** Primorsky Krai, Vladivostok Botanical Garden, 43.2222°N 131.9936°E, coniferous-broad-leaved forest, winter traps, 20 November 2016 – 11 March 2017, 3 specimens (slides) and more than 120 individuals (alcohol), leg A.D. Komisarenko.

REMARKS. The types of this species (two males and three females) were originally found in the Khabarovsk Territory, located quite far from the new locality (about 1000 km to the northeast), and the species, apparently, is widespread in the Russian Far East. Nevertheless, its high abundance in a winter collection is rather intriguing. The new material of this species is fully consistent with the original description, with the exception of a diffuse colouration of the entire body and darker ocelli.

Anurida elegans Babenko, Shveenkova et Kuznetsova, 2019

MATERIAL EXAMINED. **Russia:** Primorsky Krai, Vladivostok Botanical Garden, 43.2222°N 131.9936°E, coniferous-broad-leaved forest, winter traps, 20 November 2016 – 11 March 2017, 5 specimens (slides), leg A.D. Komisarenko.

REMARKS. The types of this species (a male and three juveniles) were collected in the Sikhote-Alin Nature Reserve, located less than 500 km northeast of Vladivostok. The new material is characterized by the presence of traces of a blue pigment throughout the body and dark eyes, as described for the largest specimen (holotype) of the type series.

ACKNOWLEDGEMENTS

I express my sincere thanks to Anatoly Komisarenko (Vladivostok), who collected this interesting material during his student work, as well as to both Yuri Marusik (Institute for Biological Problems of the North DVO RAS, Magadan) and Kirill Eskov (Paleontological Institute RAS, Moscow) for the primary sorting of material and for transferring the specimens to me. I am also obliged to Sergei Golovach (Severtsov Institute of Ecology & Evolution RAS, Moscow), who significantly improved the English of an earlier draft and to the anonymous reviewers, whose feedback was critical to this article.

REFERENCES

- Babenko, A.B., Shveenkova, Yu.B. & Kuznetsova, N.A. 2019. New species of the genus *Anurida* (Collembola, Neanuridae) from the Far East of Russia. *Zoologicheskii Zhurnal*, 98(2): 130–148. DOI: 10.1134/S004451341902003X
- Babenko, A. & Nakamori, T. 2021. A new *Anurida* species of the *hammerae*-group from the Russian Far East (Collembola, Neanuridae). *Zootaxa*, 4995(2): 367–374. DOI: 10.11646/zootaxa.4995.2.9
- Bulah, E.M., Galanina, I.A., Kostenko, V.A., Nechaev, V.A., Petropavlovsky, B.S., Khrapko, O.V. & Chistyakov, Yu.A. 2010. Natural phenomenon in Vladivostok. *Vestnik DVO RAS*, 4: 90–96. [In Russian]
- Deharveng, L. 1983. Morphologie évolutive des Collemboles Neanurinae en particulier de la lignée Néanurienne. *Travaux du Laboratoire d'Ecobiologie des Arthropodes Edaphiques, Toulouse*, 4(2): 1–63.

- Fjellberg, A. 1985a. Arctic Collembola. I. Alaskan Collembola of the families Poduridae, Hypogastruridae, Odontellidae, Brachystomellidae and Neanuridae. *Entomologica Scandinavica*, Supplement 21: 1–126.
- Fjellberg, A. 1985b. Elements of dorsal chaetotaxy in Neanuridae with descriptions of two new species of *Anurida* (Collembola). *Entomologica Scandinavica*, 15: 349–362.